CLAIMS

What is claimed is:

- 1. An imaging system using short wavelength radiation, comprising an achromatic Fresnel objective lens.
- 2. An imaging system as claimed in claim 1, wherein the short wavelength radiation is extreme ultraviolet radiation.
- 3. An imaging system as claimed in claim 1, wherein the short wavelength radiation is soft x-ray radiation.
- 4. A system for actinic imaging metrology of short wavelength lithography masks comprising an achromatic Fresnel objective lens.
- 5. A system as claimed in claim 4, wherein the short wavelength radiation is extreme ultraviolet radiation.
- 6. A system as claimed in claim 4, wherein the short wavelength radiation is soft x-ray radiation.
- 7. Achromatic Fresnel lens for radiation with a 13 to 14 nanometer wavelength comprising a zone plate made from molybdenum (Mo), niobium (Nb), Technetium (Tc), or Ruthenium (Ru).
- 8. A method for imaging 13 to 14 nanometer wavelength, comprising using a silicon refractive lens to correct the chromatic aberration of a zone plate to increase a bandwidth for 13 to 14 nm wavelength radiation.
- 9. A optical system comprising:
 - an extreme ultraviolet radiation source;
 - a spectral filter;
 - a reflective condenser;

an aperture; and an objective lens; and

a spatially resolved detector.

- 10. An optical system as claimed in claim 9, wherein the source is a laser-plasma source.
- 11. An optical system as claimed in claim 9, wherein the source is a gas discharge source.
- 12. An optical system as claimed in claim 9, wherein the spectrum filter is a multilayer filter.
- 13. An optical system as claimed in claim 9, wherein the condenser is a multilayer coated spherical surface.
- 14. An optical system as claimed in claim 9, wherein a virtual source of the extreme ultraviolet radiation source formed by the condenser and the region of interest of the mask residing on a Rowland circle determined by the condenser.
- 15. An optical system as claimed in claim 9, wherein the detector is a CCD camera.
- 16. An optical system as claimed in claim 9, wherein the detector is a CMOS camera.
- 17. An optical system as claimed in claim 9, wherein the objective lens comprises an achromatic Fresnel optic with a silicon refractive lens.
- 18. An optical system as claimed in claim 9, wherein the source uses emission from a copper target.
- 19. An optical system as claimed in claim 9, wherein the objective lens comprises an achromatic Fresnel optic with a refractive lens made from copper.